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EXAMINER

PHAM, HUNG Q

ART UNIT PAPER NUMBER

2172

DATE MAILED: 09/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/770,017

Applicant(s)

KOBAYASHI, MASAYOSHI

Examiner

HUNG Q PHAM

Art Unit

2172

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7,8,10,11,14,15,22-27 and 29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7,10,14,22,24-27 and 29 is/are rejected.
- 7) ☒ Claim(s) 8,11,15 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 07/14/04.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

1. Applicant cancelled claims 1-6, 9, 12-13, 16-19, 21 and 28, amended claims 24-27 and 29 in the amendment filed 07/14/2004. The pending claims are 7, 8, 10, 11, 14, 15, 22-27 and 29.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 02/11/2004 was filed after a Request for Continued Examination on 01/09/2004. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Response to Arguments

3. Applicant's arguments filed 07/14/2004 have been fully considered but they are not persuasive.

As argued by applicant on page 11, lines 12-17:

Powers et al. shows that in a summary tree, a summary node representing the same set of records appears in several places of the tree, depending on the order of dimensions used to access it. Accordingly, by changing different summary nodes having the same contents into a single summary node, the amount of memory can be reduced. However, Powers et al. does not show which part of the tree should be replaced with a summary node. Specifically, there is no teaching or suggestion of determining whether the amount of memory required when replacing a node with a summary table is smaller than that required without the used of such replacing. In contrast, the invention defined in claim 24 provides a criterion by which to determine which part of the tree should be replaced with the table.

For at least the foregoing reasons, claim 24 is believed clearly patentable over Powers et al. The other independent claims each recite features substantially similar to those discussed above in connection with claim 24 and are believed to distinguish over Powers et al. for at least the same reasons.

Examiner respectfully traverses because of the following reasons:

As in FIG. 5 is the technique for eliminating redundancy. In the summary tree, a summary node representing the same set of records appears in several places of the tree, depending on the order of dimensions used to access it. For instance, the summary node 120 representing the set of records with dimension field SEX having value M and dimension field ZIPCODE having value 02046 is in a different part of the tree than the summary node representing records with dimension field ZIPCODE having value 02046 and dimension field SEX having value M. The corresponding sub tree 88 could be shared among different parts of the tree 122, 124, reducing the duplication (Col. 6, Lines 3-16).

As seen, the summary node 120 is created under two nodes 122 and 124, and instead of two summary nodes, only one summary node is used. The forming of the summary node 120 is determined by an occurrence of redundancy. The technique of eliminating the redundancy implies an amount of memory required when replacing a node with a summary table is smaller than that required without the used of such replacing. Thus, an eliminated redundancy process or amount of memory required when replacing a node with a summary table is smaller than that required without the used of such replacing, obviously, could be used as a condition to determine the generation of summary node 120.

Art Unit: 2172

For at least the reasons as discussed above, claim 24 and the other claims are unpatentable over Powers et al.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 7, 10, 14, 22, 24-27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Powers et al. [USP 5,404,513] in view of Jeffries [USP 6,633,879 B1].**

Regarding to claims 24, 25, 26, 27 and 29, Powers teaches a method for organizing data to be accessed by a digital computer. As shown in FIG. 3, a summary tree as *an assumed tree structure in which all the items of data are stored is formed*. As shown in FIG. 5 is a technique for eliminating redundancy by sharing a sub-tree of the summary tree if possible. As disclosed by Powers, in the summary tree, a summary node representing the same set of records appears in several places of the tree, depending on the order of dimensions used to access it. For instance, the summary node 120 representing the set of records with dimension field SEX having value M and dimension field ZIPCODE having value 02046 is in a different part of the tree than the

Art Unit: 2172

summary node representing records with dimension field ZIPCODE having value 02046 and dimension field SEX having value M (Col. 6, Lines 3-16). As seen, the node 124 and its sub-tree representing records with dimension field ZIPCODE: 02046 and dimension field SEX: M under node 124 is sequentially selected for eliminating the redundancy as the step of *sequentially selecting a node from the assumed tree structure to select a sub-tree structure including the selected node and any child nodes of the selected node*. As shown in FIG. 6 is the structure of a summary node for *storing at least a portion of the items of data included in the selected sub-tree structure in a table form* (FIG. 6, Col. 5, Lines 32-38). Referring back to FIG. 5, summary node 120 replaces the summary node of 124 as the step of *replacing the selected sub-tree structure with a summary node to construct the data structure*. Powers does not explicitly teach the step of forming *an equivalent table* for storing at least a portion of the items of data, and the step of *determining whether the selected sub-tree structure satisfies one or more predetermined condition; wherein the predetermined conditions are that: 1) an amount of memory required to store a data structure including the equivalent table in place of the selected sub-tree structure is smaller than that required to stored the assumed tree structure; and 2) search performance of the data structure is not lower than that of the assumed tree structure*, and performing the step of replacing *when the selected sub-tree structure satisfies the one or more predetermined conditions*. However, a taught by Powers, the summary tree consists of three types of nodes: summary nodes, dimension nodes, and detail index nodes. Summary nodes contain summary information, while dimension nodes and detail index nodes simply provide structure to the tree (Col. 5, Lines 27-31). A dimension node and

Art Unit: 2172

its child summary nodes can be represented using a two-dimensional table (Col. 6, Lines 30-31). Thus, instead of using nodes for storing information, obviously, a two-dimensional table as *an equivalent table* could be used for storing at least a portion of the items of data, and the structure of the summary tree is still the same. Referring back to FIG. 5, the summary node 120 is created under two nodes 122 and 124, and instead of two summary nodes, only one summary node is used. The forming of the summary node 120 is determined by an occurrence of redundancy as condition. The technique of eliminating the redundancy, obviously, is to ensure an *amount of memory required to store a data structure including the equivalent table in place of the selected sub-tree structure is smaller than that required to store the assumed tree structure*. Thus, an eliminated redundancy process or *amount of memory required to store a data structure including the equivalent table in place of the selected sub-tree structure is smaller than that required to store the assumed tree structure*, obviously, could be used as a condition to determine the generation of summary node 120. Jeffries teaches a method for determining a maximum search time (Jeffries, Col. 9, Lines 23-45). As seen, the Jeffries maximum search time could be used as a threshold to determine the access time for the rebuilt summary tree. It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Powers method by using a table to represent a summary node, and an amount of memory or search time as a condition to invoke the process of replacing the nodes in order to rebuild the summary tree for eliminating the redundancy.

Regarding to claims 7, 10, 14, 22, Powers teaches all the claimed subject matters as discussed in claims 24, 25, 26, 27, but does not explicitly teach *the selected sub-tree structure is replaced with the equivalent table to form a new data structure, a necessary amount of memory for the new data structure is smaller than that for the assumed tree structure and the selected sub-tree structure is replaced with the equivalent table to form a new data structure, a maximum search time T_{max_t} calculated from the new data structure does not exceed a maximum search time T_{max} calculated from the assumed tree structure.*

However, as taught by Powers, the summary tree is rebuilt to eliminate redundancy by sharing the summary node for reducing the duplication (Powers, Col. 6, Lines 3-16).

Obviously, instead of using two nodes, only one summary node is used, *a necessary amount of memory for the new data structure is smaller than that for the assumed tree structure.* Jeffries teaches a method for determining a maximum search time (Jeffries, Col. 9, Lines 23-45). As seen, the Jeffries maximum search time could be used as a threshold to determine the access time for the rebuilt summary tree. It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Powers method by including the technique of reducing the memory and access time in order to rebuild the summary tree.

Allowable Subject Matter

6. Claims 8, 11, 15 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding to claims 8, 11, 15 and 23, Powers and Jeffries also teaches a method for controlling storage and retrieval of data. However, Powers and Jeffries fails to teach or suggest *a decision on whether the condition (1) is satisfied is made depending whether the following equation is satisfied:*

$$N_D \leq N_L \times K, \text{ when } K = T_e / T_n$$

where N_D is the number of items of data included in the selected sub-tree structure, N_L is the number of levels of selected node or lower in the assumed tree structure, T_n is search time per node, and T_e is search time per entry in the equivalent table.

Conclusion

7. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Art Unit: 2172

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG Q PHAM whose telephone number is 703-605-4242. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JOHN E BREENE can be reached on 703-305-9790. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Examiner Hung Pham
September 15, 2004


SHAHID ALAM
PRIMARY EXAMINER